

N-CHANNEL MOS FIELD EFFECT TRANSISTOR
FOR HIGH SPEED SWITCHING

DESCRIPTION

The 2SK1399 is an N-channel vertical type MOS FET which can be driven by 2.5-V power supply.

The 2SK1399 is driven by low voltage and does not require consideration of driving current, it is suitable for appliances including VCR cameras and headphone stereos which need power saving.

FEATURES

- Can be driven by a 3.0-V power source
- Not necessary to consider driving current because of it is high input impedance
- Possible to reduce the number of parts by omitting the bias resistor
- Can be used complementary with the 2SJ185

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|-------------------|
| 2SK1399 | SC-59 (Mini Mold) |

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

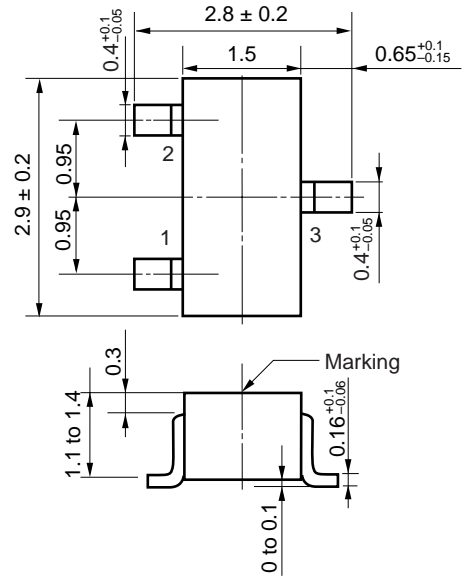
| | | | |
|---------------------------------------|-----------------------|-------------|----|
| Drain to Source Voltage | V _{DSS} | 50 | V |
| ★ Gate to Source Voltage | V _{GSS} | ±7.0 | V |
| Drain Current (DC) | I _{D(DC)} | ±100 | mA |
| Drain Current (pulse) ^{Note} | I _{D(pulse)} | ±200 | mA |
| Total Power Dissipation | P _T | 200 | mW |
| Channel Temperature | T _{ch} | 150 | °C |
| Operating Temperature | T _{opt} | -55 to +80 | °C |
| Storage Temperature | T _{stg} | -55 to +150 | °C |

Note PW ≤ 10 ms, Duty Cycle ≤ 50 %

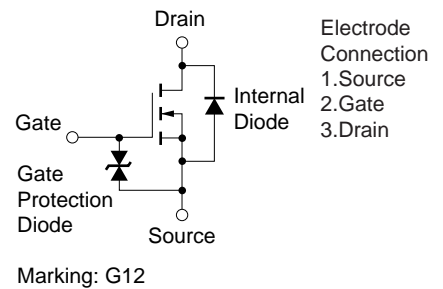
Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DRAWING (Unit : mm)



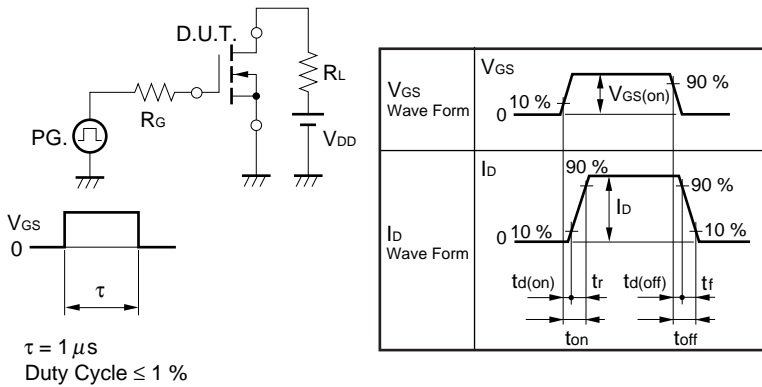
EQUIVALENT CIRCUIT



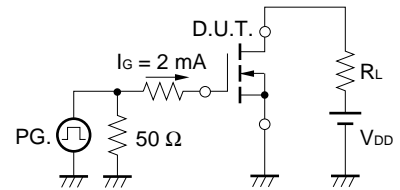
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------------------|----------------------|--|------|------|------|------|
| Drain Cut-off Current | I _{DSS} | V _{DS} = 50 V, V _{GS} = 0 V | | | 10 | μA |
| ★ Gate Leakage Current | I _{GSS} | V _{GS} = ±7.0 V, V _{DS} = 0 V | | | ±5.0 | μA |
| Gate Cut-off Voltage | V _{GS(off)} | V _{DS} = 3.0 V, I _D = 1.0 μA | 0.9 | 1.2 | 1.5 | V |
| Forward Transfer Admittance | y _{fs} | V _{DS} = 3.0 V, I _D = 10 mA | 20 | 38 | | mS |
| Drain to Source On-state Resistance | R _{DS(on)1} | V _{GS} = 2.5 V, I _D = 10 mA | | 22 | 40 | Ω |
| | R _{DS(on)2} | V _{GS} = 4.0 V, I _D = 10 mA | | 14 | 20 | Ω |
| Input Capacitance | C _{iss} | V _{DS} = 3.0 V | | 8 | | pF |
| Output Capacitance | C _{oss} | V _{GS} = 0 V | | 7 | | pF |
| ★ Reverse Transfer Capacitance | C _{rss} | f = 1 MHz | | 3 | | pF |
| Turn-on Delay Time | t _{d(on)} | V _{DD} = 3.0 V | | 15 | | ns |
| Rise Time | t _r | I _D = 20 mA | | 100 | | ns |
| Turn-off Delay Time | t _{d(off)} | V _{GS(on)} = 3.0 V | | 30 | | ns |
| Fall Time | t _f | R _G = 10 Ω, R _L = 150 Ω | | 35 | | ns |

★ TEST CIRCUIT 1 SWITCHING TIME

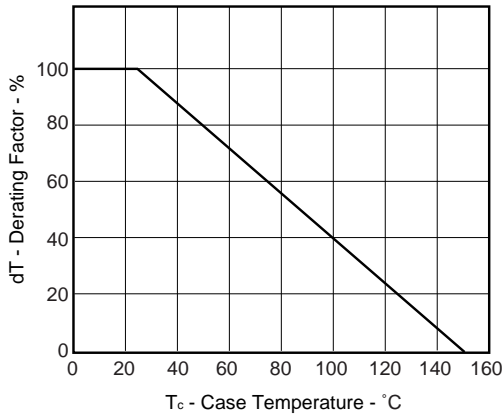


TEST CIRCUIT 2 GATE CHARGE

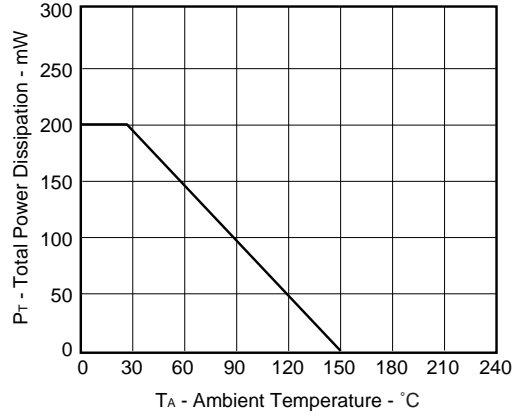


TYPICAL CHARACTERISTICS (T_A = 25°C)

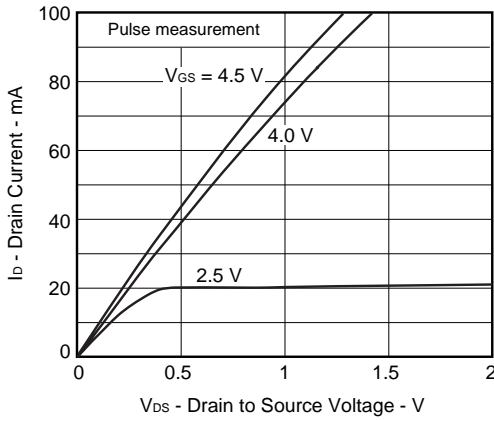
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



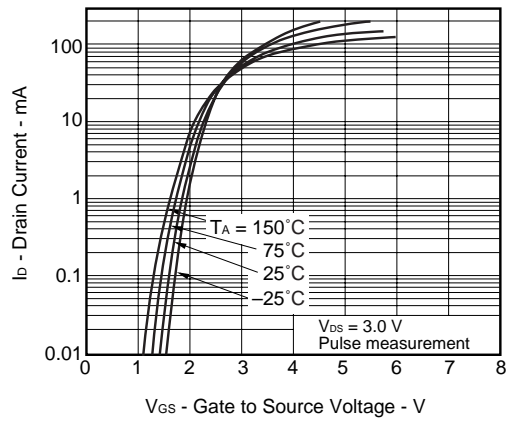
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



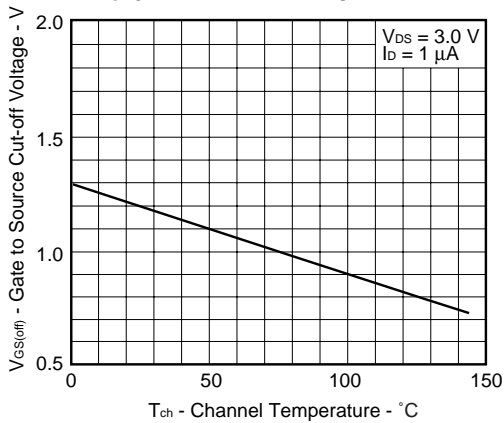
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



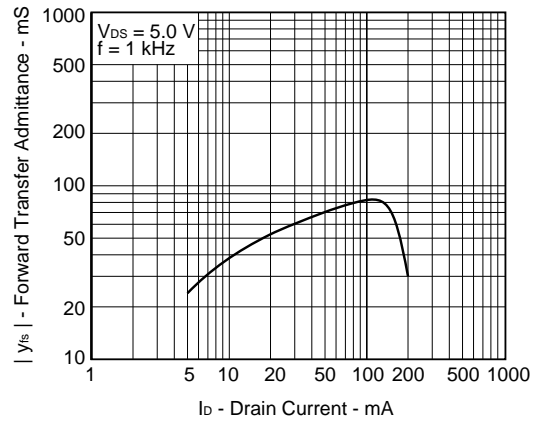
TRANSFER CHARACTERISTICS

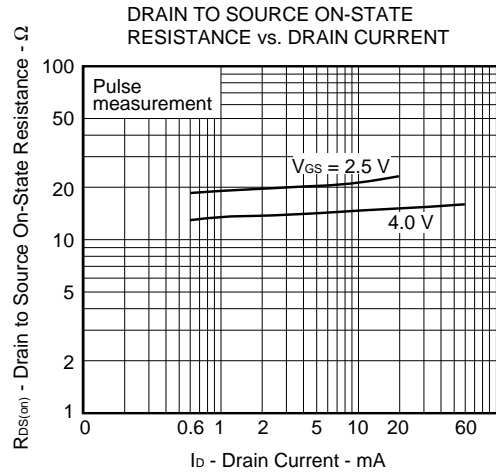
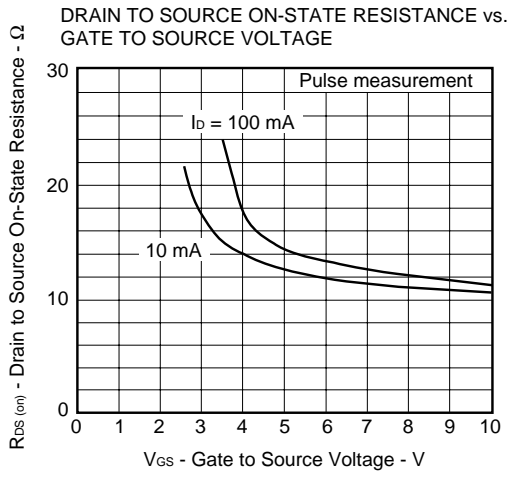


GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT





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